

Kinetoplastid Biology and Disease

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Review

Review of the World Class Parasites Book Series

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Published: 28 October 2003

Kinetoplastid Biology and Disease 2003, **2**:9

This article is available from: <http://www.kinetoplastids.com/content/2/1/9>

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Received: 31 July 2003

Accepted: 28 October 2003

Introduction

According to the Series Editors, "The World Class Parasites book series are written for researchers, students and scholars who enjoy reading about excellent research on problems of global significance. Each volume focuses on a parasite, or group of parasites, that has a major impact on human health, or agricultural productivity, and against which we have no satisfactory defense. The volumes are intended to supplement more formal texts that cover taxonomy, life cycles, morphology, vector distribution, symptoms and treatment. They integrate vector, pathogen and host biology and celebrate the diversity of approach that comprises modern parasitological research."

Three volumes deal with kinetoplastid disease: Volume 1 – the African Trypanosomes, Volume 4 – Leishmaniasis, Volume 7 – American Trypanosomiasis. We asked 5 independent experts to assess the quality of these volumes and the extent to which they had met their stated aims.

(Ed)

Review I – F.E.G. Cox

World Class Parasites: Volume 1 The African Trypanosomes. Edited by Samuel J. Black and J. Richard Seed. Kluwer Academic Publishers, Boston, Dordrecht and London. 2001. 179 pages.

\$115, €79, Euro 127.50.

ISBN 0-7923-7512-2

The African Trypanosomes is the first in a series of volumes that is intended to cover those parasites that have a major impact on human health or agricultural productivity in such a way that they supplement standard textbooks with particular reference to parasitological research. This first volume should, therefore, set a standard against which the laudable aims of the series must be judged. First impressions are important and, at first glance, this is an unattractive volume. It has ragged right hand margins, very few words to the line (8–10) and the references are so cramped that they are difficult to locate and read. The Index is spoiled by the fact that about two thirds of all entries are headed Trypanosome... this takes some getting used to. The figures are very sparse and most of them of poor quality. Anyhow one should not judge a book by its cover, what about the content? Here there is real quality. The book starts with a provocative essay by David Molyneux on the failure of science and public health to combat African trypanosomiasis, concerns that are returned to later in the volume. Because of these perceived failures it is important to consider the problems inherent in trypanosome and tsetse fly control and the different kinds of approaches that have been adopted. Some of these are discussed in the chapters on the Programme against African Trypanosomiasis Information System (PAATIS) (M. Gilbert and colleagues), tsetse vector based strategies for control of African trypanosomiasis (S. Askoy) and trypanosomiasis risk assessment taking into

account the effects of climate, human population changes (J.J. McDermott and colleagues). Moving from the vector to the parasites themselves, there are chapters on better methods diagnosis (P. Büscher) and the development of chemotherapeutic agents (Richard Seed and David Boykin) and a speculative chapter on vaccination (Samuel Black and colleagues). The host responses are considered in two chapters on the immunobiology of African trypanosomiasis (John Mansfield and colleagues) and the mechanisms of trypanotolerance in cattle (J. Naessens and colleagues). The explosion of investigations at the molecular level are reflected in chapters on endocytosis (Derek Nolan and colleagues), the characterization of the trypanosome genome (John Donelson) and trypanosome factors controlling population size and differentiation (N.B. Murphy and T. Olijhoek). The volume ends with a thought-provoking epilogue by the editors which includes such phrases as '...whether our scientific enterprise is a sham...', '... honest attempt to meet the challenges posed by African trypanosomes, or simply a data collecting exercise that is indifferent to individual suffering.' There are, inevitably, gaps in the coverage, as the editors admit in their epilogue, but my only regret is that there was nothing on disease and pathogenesis, areas in which molecular biology is beginning to provide important clues as to what is happening in humans and animals afflicted by trypanosomiasis.

So, what is the verdict; has this volume achieved its aims? The answer is a resounding yes. Readers will need to consult a standard textbook for background information about trypanosomes and trypanosomiasis and this volume for the complementary information, ideas and insights that lead from the textbook to the primary literature. Anyone who has ever asked the question 'Why are they doing this?' will find some of the answers here. This is a book to be highly recommended for anyone interested in trypanosomiasis or working with trypanosomes even though these two interests are not necessarily the same. Make sure that your laboratory or library has a copy.

Review 2a – D. McMahon-Pratt

World Class Parasites: Volume 4 Leishmania. Edited by Jay P. Farrel. Kluwer Academic Publishers, Boston, Dordrecht and London. 2002. 193 pages.

\$125, €90, Euro 145.

ISBN 1-4020-7036-5

This volume provides an overdue, well-needed and succinct update on the clinical, epidemiological, ecological and basic science aspects (immunology, pathophysiology, drug resistance and metabolism) of leishmaniasis by experts in the field. Leishmaniasis is widely distributed

throughout the world; the disease threatens 350 million people in 88 countries world-wide. However, not since the Chang and Bray and/or Killick-Kendrick and Peters volumes published approximately 25 years ago has there been a monograph published providing a current and complete overview of the field. This has been to the detriment of those who teach parasitology or to anyone entering this field. Comprehensive reviews suitable as readings for advanced undergraduate or graduate students are rare. Further, most reviews are highly focused and specialized to the exclusion of providing a general biological overview. In a quickly evolving field, such as leishmaniasis, this is understandable; however, it is to the credit of Dr. Farrell (who edited this volume) that this deficiency has been filled. Each chapter is succinct, yet covers an important aspect of the biology, ecology, epidemiology or clinical disease; references provided are particularly useful.

Leishmaniasis is a spectrum of diseases ranging from the cutaneous, to visceral; the diverse clinical forms of disease are caused by multiple species, with different reservoir hosts and insect vectors. Hence, there is considerable complexity in the biology to be understood, as indicated by the first four chapters by Drs. Dedet, Shaw, Killick-Kendrick and Campino. The first four chapters provide an overview of the epidemiology of this spectrum of diseases and include reviews of the ecology of New World leishmaniasis, biology of phlebotomine sand flies (insect vector), and epidemiology of visceral leishmaniasis. The next chapters focus on topics devoted to understanding the biology of the host-parasite and vector-parasite interactions. The chapter by Dr. Kamhawi on the *Leishmania* parasites within the digestive tract of phlebotomine sand flies summarizes important aspects relevant to parasite transmission, namely, the relationship of LPG to parasite vector-midgut association as well as the effect of salivary components on the transmission of disease. The interactions of the parasite with the macrophage are covered in the next two chapters. The immunological consequences of receptor-ligand interactions (CR3, FcR, CR1) utilized in parasite uptake in terms of the establishment and maintenance of infection are presented (Drs. Mosser and Brittingham). This section discusses the differences between the promastigotes (seen only in the initiation of infection) and amastigote (found during chronic infection in the mammalian host) developmental stages in these processes. The effect of infection on the function of macrophages is relevant to immunology (as macrophages are important antigen-presenting cells). The parasite clearly causes impairment in the signal transduction pathways utilized for macrophage activation by various cytokines and chemokines; hence, these signal transduction pathways may represent potential chemotherapeutic targets. This topic is discussed in the chapter by Dr. Matlashewski. The chapter by Drs. Zilberstein and Ephros covers chemo-

therapy, and reviews existing therapies, and discusses what is currently known about the mode of drug action and mechanisms of drug resistance. The last three chapters (Drs. Kaye, Farrell, and Campos-Neto) are focused on what is known concerning the immune response to leishmanial infection – our understanding of the mechanisms of pathogenesis as well as recent progress towards the development of vaccine against cutaneous leishmaniasis. Concise, these provide a thoughtful overview of what has been determined about immune mechanisms that control infection. The chapter on cutaneous leishmaniasis is appropriately focused on *Leishmania major*, which has been the mainstay of immunological studies. However, given the distinctions found for New World *Leishmania* (*L. mexicana* complex) from *L. major*, additional information concerning this aspect would have provided a more complete picture of the diversity of pathogenesis. The fact that we need to know more about the human immune response to infection is underscored in these chapters and the important advances made in the past decade concerning the immunological features of visceral and cutaneous diseases are clearly presented. In short, "World Class Parasites: LEISHMANIA" provides a long overdue concise, yet comprehensive current overview of the leishmaniasis – what has been learnt over the past 25 years – and what remains to be understood about this interesting genus of parasitic protozoans!

Review 2b – K.P. Chang

World Class Parasites: Volume 4 Leishmania. Edited by Jay P. Farrell. Kluwer Academic Publishers, Boston, Dordrecht and London. 2002. 193 pages.

\$125, €90, Euro 145.

ISBN 1-4020-7036-5

This book is a useful reference for researchers, especially for updated information presented in table form for *Leishmania* spp. (pp. 3 and 14-6), sand fly vectors (pp. 34-5) and regimens of chemotherapy (pp. 135-6). Authors were well-chosen to introduce the topics of their own research presented in 11 chapters (~15 pages each). Most chapters are, by necessity, focused largely on the authors' own work or views due apparently to page limitation. This is adequate and even desirable for frequently reviewed subjects, such as sand fly biology by Killick-Kendrick; or a relatively specific or new topic, which is naturally so or made so by the authors' skills, such as membrane transport by Landfear and *Leishmania* infection on macrophage function by Matlashewski. These chapters are thus probably most friendly to the general reader. The same can be said to a greater or lesser extent for chapters on macrophage receptors for *Leishmania* by Mosser and Brittingham, chemotherapy of leishmaniasis by Zilberstein and Ephros, and

Leishmania-sand fly interactions by Kamhawi. The space allocated is clearly insufficient to account for all necessary details, diversities and unknowns in the epidemiology of human and canine leishmaniasis, as presented by Dedet, Shaw and Campino as well as for the complexities and uncertainties in the immunobiology of leishmaniasis by Kaye, Farrell and Campos-Neto. These chapters will undoubtedly be appreciated by the specialists, but may not be by general readers who have little or no prior exposure to the caveat or nuance of *Leishmania* epidemiology and immunology. An exception to this may be the chapter by Campos-Neto on vaccines, since this is an area of great interest, and since some data from work in progress were presented. The book would be improved with the addition of another chapter or two on cell and molecular biology of *Leishmania* to discuss, for example, some exciting discoveries and development, e. g. unique cell organelles (e. g. tubular lysosomes, acidocalcisomes), glycobiology, gene expression, genome project, molecular genetics, kinetoplast RNA editing. Some of these topics are trypanosomatid-, but not necessarily *Leishmania*-specific. Still, our knowledge of how parasites and hosts work at cellular and molecular levels is crucial in our attempt to understand their interactions that makes leishmaniasis so unique in all aspects from epidemiology to immunobiology. There is high hope to render these biological phenotypes less descriptive and more clearly defined by genomic, proteomic, glyconomic, metabolomic and other bioinformatic approaches.

There are several non-scientific distractions. There appears to be no copy-editing work, resulting in too many incomplete literature citations (four in pp. 147-50), and many typographic errors in the text, including two in the Preface. The Index is too brief and chapters are illustrated with very few diagrams and no photographs. These deficiencies are possibly due to a desire for rapid publication to keep chapters current and/or to cost-cutting measures established by the publisher.

Nevertheless, many readers will find interesting thoughts and insights from their own perspectives in many chapters of this book, including this reviewer with decades of exposure to *Leishmania* and leishmaniasis. I find Shaw's historical view on this disease in the Amazon region interesting, as described in his chapter on South American leishmaniasis. His writing on the separation of subgenous *Leishmania* and *Viannia* clarifies some confusion of our own experimental data. It is also interesting that PKDL is thought to result from the targeting of effector function against parasites in the skin of patients recovering from VL after chemotherapy, as stated by Kaye citing the work of Theander's group. These are just several examples of my own deficiencies rectified by reading this book. Other

readers will find specific points of interest according to their own backgrounds and knowledge.

The editor and serial editors deserve our appreciation and congratulations for their successful endeavour by putting this volume together for publication. There has been no hard cover book devoted to *Leishmania* since the late 1980's. This book may well be the last one of this kind, since in this era of information highway, the next book on *Leishmania* and leishmaniasis is likely to be electronically digitized for sale in the website. I will make sure to keep my copy around and urge you all to rush order a copy before it is sold

Review 3a – S. Goldenberg

World Class Parasites: Volume 7 American Trypanosomiasis. Edited by Kevin M. Tyler and Michael A. Miles. Kluwer Academic Publishers, Boston, Dordrecht and London. 2002. 166 pages.

\$110, €70, Euro 112.

ISBN 1-4020-7323-2

Chagas' disease owes its name to the Brazilian scientist Carlos Chagas, who first studied and described this disease about a century ago and showed that *Trypanosoma cruzi* was its etiological agent. Many articles have since been published about this disease and its causal agent. *T. cruzi* has indeed proved to be a useful model for studying basic aspects of modern biology. However, a single source work providing up-to-date information about various aspects of the parasite was lacking until the publication of this 7th Volume of the World Class Parasites Collection.

This book is divided into 14 chapters, each written by an expert in the field concerned, providing the reader with state-of-the art information about each subject, ranging from public health concerns to the genetic manipulation of *T. cruzi*. This collection of articles, each of which stands alone, begins with a basic description of the lifecycle of *T. cruzi*. Subsequent chapters deal with various aspects of *T. cruzi* cell biology, the mechanisms of cell invasion, the immunopathology of Chagas' disease, clinical aspects of the disease and perspectives for the development of new pharmacological treatments, the evolution of *T. cruzi* and its relationship to the invertebrate triatomine intermediary host and perspectives for controlling *T. cruzi* transmission by the paratransgenesis of bacteria residing in the digestive tract of triatomines.

However, this work is open to criticism on several points. The major criticism concerns the poor quality of the illustrations, which are of little or no help for those who do not work on the subject of the chapter. Another point of

criticism concerns the bibliography at the end of the chapters. Some chapters include vast reference lists whereas in others, assumptions are made without a reference being given, which is of little help to the reader.

However, these faults do not diminish the relevance of this book for those interested in gaining insight into the problems and perspectives of this fascinating field of trypanosomiasis research.

Review 3b – J. Scharfstein

World Class Parasites: Volume 7 American Trypanosomiasis. Edited by Kevin M. Tyler and Michael A. Miles. Kluwer Academic Publishers, Boston, Dordrecht and London. 2002. 166 pages.

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In the late seventies, the publication of Brener and Andrade's first edition of "*Trypanosoma cruzi* e Doença de Chagas" gifted the latin American scientific community with a detailed account of the Chagas' disease research legacy. However, unfortunately this privilege was not extended to the community of researchers, scholars and students that do not understand Portuguese or spanish. Kevin Tyler and Michael Miles have now taken the initiative to fill up this gap by editing "American Trypanosomiasis", a new volume of the Kluwer's World Class parasites series. Organized in 14 chapters, this compact book covers a wide range of relevant topics, is written by some of the best specialists in the field, and is accessible to the non-specialists. Although there is considerable variation in style among chapters and occasional duplication of content, the text is well-written, and will definitively prove a valuable alternative to the scattered reviews that cover each of the specific themes addressed in this volume. Overall, the reading flows well, the chapters nicely blend with each other. In producing the work, the editors have clearly given preference to quality over matters of style. An obvious deficiency of the book was the inconsistent treatment of bibliography; in some chapters, there was excessive use of review citations, which will not making justice to the authors responsible for original discoveries.

The book starts with an objective account of *T. cruzi* life cycle and this is followed by a comprehensive review of *T. cruzi* cell biology. At the core of the book we find excellent chapters covering developments in molecular genetics, biochemistry and molecular biology. After being introduced to the astounding genetic diversity of *T. cruzi*, we learn how the pathogens' molecular machinery enables their survival in so many distinct environments. Chapters dealing with signaling pathways are particularly instruc-

tive, and some of these texts were adequately supported by schematic illustrations-unfortunately used too modestly thorough the book. The knowledge described in the preceding chapters offers a basis to understand the puzzles faced by research in molecular pathogenesis. After learning how parasite activity may be linked to cardiovascular dysfunction, readers are confronted with different perspectives about immunopathogenesis. It is gratifying to know that conflicting views about role of tissue parasitism and autoimmunity are not as sharp as they used to be decades ago. There is now consensus that myocardial parasitism, although scarce, is nonetheless persistent and most likely essential for the development of chronic cardiomyopathy. Moving into clinical research, readers are then provided with detailed review on the present status of chemotherapy. After learning about the success and limitations of current antiparasite drugs, readers will know of the growing list of potent compounds generated by rational drug design. In the last segment of the book, we learn about genetic mechanisms involved in evolution of *Trypanosoma cruzi* and triatomines and their impact on the epidemiology of Chagas1 disease. The volume ends with a chapter discussing critically alternative strategies for the control of Chagas disease. In conclusion, American Trypanosomiasis is a fundamental english title, which offers a comprehensive vision of current status of Chagas disease research both to specialists and non-specialists.

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